

I claim:

1. A modular fuel cell power generation system,  
comprising:

a plurality of modular fuel cells and receiving sections,  
each of said modules having fuel cells in a stack between  
electrically conductive end plates and at least as many  
receiving sections in a base assembly having electrical bus  
strips and fuel gas and air distribution headers;

each of said modules further having manifolds adjacent said  
end plates having ports and internal passages connected to the  
ports for gas flow in supply and return passages providing  
uniform supply of fuel and reactant gases to each said fuel cell  
in said modules;

said headers having spring loaded valves for respective  
ports that supply fuel gas and air and that vent reactive gas  
and air, respectively, with an actuator for each said valve that  
is engaged by insertion of said module within said receiving  
section when said ports of said manifolds and corresponding  
ports of said headers are aligned; and

said modules having electrical connection said end plates  
and said base when said module is inserted in said receiving  
section.

2. A modular fuel cell power generation system, according  
to claim 1, wherein said headers and said manifolds each have

sides that engage one another in which said ports are disposed and each of said sides is tapered to wedge said module in between said headers of said receiving section to establish a compressive force that maintains a face seal between said aligned ports when said module is inserted in said receiving section.

3. A modular fuel cell power generation system, according to claim 1, wherein said end plates have electrical plugs protruding outwardly from said module toward said base of said receiving section and said base has receptacles for receiving said plugs when said module is inserted in said receiving section.

4. A modular fuel cell power generation system, according to claim 1, wherein said electrical plugs engage said sockets with sufficient force to maintain said module in said receiving section.

5. A modular fuel cell power generation system, according to claim 1, wherein said tapered sides of said manifolds and said headers have a matching taper angle of approximately four degrees.

6. A modular fuel cell power generation system, according to claim 1, wherein said modules have a handle with portions of the handle engaging the actuators of said valves when said

module is inserted in said receiving section to open gas flow through said valves.

7. A modular fuel cell power generation system according to claim 1, further including each said fuel cell including a bipolar plate having anode and cathode gas feed sides each having grooves for supplying gas within an individual cell;

said grooves having tapered-width micro-channel grooving that provides a significantly improved level of fuel and reactant gas distribution uniformity over the active area of each said cell.

8. A modular fuel cell, comprising:

a plurality of fuel cells in a stack between electrically conductive end plates, each said fuel cell including a bipolar plate having anode and cathode gas feed sides each having grooves for supplying gas within an individual cell;

said grooves having tapered-width micro-channel grooving that provides a significantly improved level of fuel and reactant gas distribution uniformity over the active area of an individual cell.